

# Predesign and Context

## THE BUILT ENVIRONMENT'S ROLE

The built environment is pivotal in shaping human experiences and influencing cognitive performance, overall wellbeing, and operational efficiency. It can enhance employee satisfaction, reduce absenteeism, and mitigate employer healthcare expenses, ultimately contributing to increased profitability.

A well-designed built environment can greatly impact how people work, heal, and learn. In offices, thoughtful layouts reduce distractions and improve workflow, making employees more productive and comfortable. In healthcare facilities, design can increase healing and provider retention rates, and in schools or academic settings, it can increase learning and positively influence behavior. The built environment can also influence our view of professionalism and the level of confidence or trust we place in the business or provider, as well as reduce energy or other resources used.

These elements are based on decisions made at the beginning of the design process during research, schematic design, and the space planning phase. Certain fundamental factors should always be part of any design process, even if they are not specifically requested. The following factors are essential considerations during the space planning phase to ensure that a building can improve the lives of all its occupants:

**Adjacencies and travel distances**—Objectively researching project types, observing actual behavior, and understanding the workflow to arrange spaces

*Space Planning Basics*, Fifth Edition. Mark Karlen, Saglinda H Roberts, Rob Fleming, and Sharon B Jaffe.  
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and functions typically used together with their associated equipment increases efficiency and reduces unnecessary travel or repetitive movement. This allows for the intentional arrangement of the rooms, spaces, and activities in a way that works best for the occupants who engage in the actual behavior. This information can also be foundational in establishing the configuration of the building shell or form of the interior space.

**Daylight and views for everyone**—Research is continually illuminating the benefits of having natural light and exterior views in buildings. Natural light is extremely important because it not only improves physical health but also increases visual acuity and productivity and creates positive experiences. It also regulates many important physiological and neurological functions essential to health and wellbeing. It is especially important where color rendition is a factor. Views are anything that is a positive distraction to a person's attention and that provides a long-distance focus for the eyes. Long-distance views are beneficial for eye health by reducing eye strain. They also help to improve emotional, physical, and cognitive health by encouraging abstract thinking, processing, creativity, and respite. In high-stress professions or situations, easy access to views is even more important. The benefits of views can be achieved with anything that provides a longer focus, such as windows, openings through multiple spaces, or across a large room. The most beneficial views are of nature. Seeking to provide natural light and views for the highest number of people in all areas of a building drastically improves the experience of the building or space.

**Break spaces and areas of respite**—The ability to step away from one's work or stressful situations or simply have a place to eat or have informal conversations is an important part of any work environment. Incorporating these spaces for private conferences, phone calls, or focused work is essential in reducing stress and creating a pleasant atmosphere. Direct access to outdoor environments can allow time for regeneration and relief from stress and can reenergize users. These are more recent priorities in design, and research increasingly validates their importance in fostering health, stress reduction, and productivity in all project types.

**Acoustics**—Noise, specifically the human voice, is noted as the most disruptive factor in many, if not all, project types. Space planning can and should be the first line of defense to reduce unwanted noise by understanding the differing noise levels of each function, grouping these together, and then using permanent walls and/or furniture to create separations to block or break up sound waves, reducing their passage to other areas. Providing additional acoustic measures is almost always required, especially in more open floor plans.

**Visual privacy**—Visual privacy is the ability to feel safe or protected from unwanted visual contact or interaction. It is related to the principle of Prospect and Refuge, which is achieved by a sense of physical and emotional safety along with the ability to survey your surroundings for threats or information. Visual privacy aids in concentration and productivity, and they can support acoustic privacy as well. Depending on the project type or population being designed for, visual privacy is of the utmost importance and requires design features. Basic visual privacy needs can be achieved by understanding the line of sight. Private functions like exam rooms, restrooms, changing areas, or anywhere a person feels or is more vulnerable require added strategies. For example, position restroom fixtures out of sight when the door is open, and do not have entrances that open directly

into main spaces. Exam or changing room doors should open to screen the exam table. For lobbies, offices, or more public areas, furniture can be arranged to create groups or nodes that facilitate privacy so that people are not directly facing each other. Understanding the client, occupants, and projected activities will provide clues as to what areas require visual and possibly physical privacy.

The overriding purpose of the built environment is to support, protect, and provide refuge for all occupants. These may seem like overwhelming additional elements to consider in addition to all the client information, but with practice, they will become an intuitive and natural part of all design phases.

## SENSE OF PLACE

Sense of place is the intangible but underlying essence of architecture and the built environment. It is the connection to a space, an attraction to, or connecting with a physical location. We may be drawn to the visual aspects of a space, but Place also touches us subconsciously. It speaks to professionalism, quality of care, respect, and equity, and influences the cultural qualities of our actions within a space. Other benefits of creating a sense of place are a deeper level of engagement with the organization, emotional safety or connection, employee retention, return business, positive or pleasant experiences, and even a desire to maintain, repair or preserve a building.

As a design professional, it is the understanding that the built environment is more than strictly visual, tactile, auditory, or olfactory sensations. It is realizing that we are touching deeper aspects of humanity and that these affect behaviors. It contributes to sustainability because a building or space that is loved is more likely to be cared for and renovated or adapted instead of being torn down. Creating a sense of place starts at the beginning of the design process and should influence every decision. The study of place and our experiences of it are the basis for the fields of Phenomenology and Environmental Psychology, and part of most, if not all, design education; this is just a reminder that even during the space planning phase, thinking about place is important.

## EVOLVING DESIGN STANDARDS

The way design is approached has changed. How people work, their equipment, technology, and amenities, now considered standard, have changed from even a few years ago, and can vary greatly even within a single project type. Advances in medicine, medical testing, psychology, and design research are supporting the extraordinary influence of the built environment on all types of perception, behavior, efficiency, and productivity.

Design norms are evolving to meet changing lifestyles. Whole new areas of study and professional focus – evidence-based design (EBD), environmental psychology, and neuroscience, for instance – are emerging and moving design toward a research-based approach to design solutions. Because of this, evaluating project needs, design directives, and programming are also changing.

The Academy of Neuroscience for Architecture (ANFA), as well as the partnering of the AIA (American Institute of Architects) with neuroscience professionals, has changed

the initial research and predesign phases of design. In addition, many of the top national and international firms have created divisions whose sole focus is to research specific project types that go on to influence their design decisions. The predesign and analysis phases are moving toward understanding clients and users in a comprehensive and holistic way to facilitate deeper, more impactful design solutions. A brief overview of the current influencing fields in design, resources for in-depth information on specific project types, and how the built environment influences behavior follow.

## **EVIDENCE-BASED DESIGN (EBD)**

EBD is an iterative and integrative approach that bases its decisions on knowledge gained through the scientific study of human interaction with spaces, environments, materials, acoustics, and visual stimuli. EBD teams look for deep-level connections between the physical environment and the inner psychological, unconscious, and neurological workings of human beings to inform design directives and objectives, strategies, and guiding principles for a broad range of project types.

The very beginnings of the field are attributed to Florence Nightingale in the mid-1800s during her time as a nurse in war hospitals, where she noticed connections between healing and the physical environment. She went on to write several books and manuals that are still being used to train nursing staff and influence healthcare design. Alvar Alto's Paimio Tuberculosis Sanatorium in Southwest Finland has been praised and studied since it opened in 1933 for its simple yet extremely effective methods that promoted health and healing. The design allowed year-round conditioned fresh air, patient privacy, infection control, and south-facing daylight for all patients. These strategies were developed collaboratively with the medical professionals running the sanatorium and were based on the latest medical practices of the day. Roger Ulrich is perhaps the most well-known and influential EBD researcher. He brought EBD to the forefront of the design industry in 1984 with his now seminal study, which showed positive differences in patient recovery based on the view outside their hospital window.

EBD has grown as a profession since then and includes the fields of neuroscience, psychology, science, and architecture. It is also known as human-centered design. It is based on an iterative process involving a broad range of interdisciplinary researchers, engineers, designers, and quantitative and qualitative information. It seeks to include the broadest range of stakeholders possible. The overriding focus is to improve design outcomes and provide dignity, support, and inclusion for everyone. The profession strives to be constantly evolving and highly values sharing and publishing data to further industry knowledge of the changes in health, behavior, and learning capability directly related to the built environment.

## **HUMAN-CENTERED DESIGN (HCD)**

Human-centered design (HCD) is a framework or design approach that holistically incorporates the needs of humanity into the design directives of a specific project. This contrasts with user-centric design, which focuses on the specific people using the space, product, or service. The overarching goal is to create spaces that increase

health, wellbeing, cultural connections, and communities in all areas. It is like universal design in that it seeks to enhance and accommodate the largest range of people in its design solutions but goes beyond the physical environment or function.

HCD seeks to create a deep and comprehensive understanding of all the needs, behaviors, and physical requirements of a population as well as the context, emotional or mental states, underlying stressors, social connections, and productivity. It is based on cognitive empathy and stakeholder involvement, seeks innovation, and is used throughout the entire design and construction process.

### Core Principles of HCD

- **Empathy**—Put ourselves into another’s place and situation.
- **Stakeholder involvement of all**—Give voice to all perspectives, especially those typically marginalized.
- **Collaboration**—Bring in all professions and information early and work on a focused goal.
- **Iteration and or prototyping**—Test designs and thought processes before the final design decisions to assess the validity and areas for improvement before the final project is completed.

Including the specific users and considering humanity in general results in creating spaces that meet the physical, deeper cultural, and aesthetic needs of all users, forming places people love. When people love and value places, it promotes:

- The health and wellbeing of the inhabitants at every scale
- Social interactions, greater cultural identity, and inclusion of a broader range of people and all their needs
- Connection with nature and geographic location, creating a sense of place
- Increasing usability for a larger population, reducing marginalization
- Greater innovation, creative infrastructural elements, and engagement
- Increase productivity and profits for businesses and individuals alike

Having a broader view of our client and their project allows us to think outside of the box and start from the space planning stage to truly accommodate and meet the project needs of a broader population in an integrative, holistic way. An example is the Villa Verde affordable housing community. The residential units provided the basic main structural, mechanical, and building envelope requirements, allowing the individual residents to expand when and as they saw fit for their specific needs. Residents only need to supply simple construction and finish materials to complete the expansion.

## GLOBAL CONTEXT

The world is more connected than ever. With the internet and globalization, businesses now serve diverse users from various cultural, religious, and socioeconomic backgrounds. Architects often design for people, places, and activities beyond their experience. Understanding the deeper, subtle, and nuanced physical, social, cultural, and emotional needs of a broad spectrum of potential users is essential.

To create inclusive spaces, designers must consider geographic location, cultural context, and social norms—both globally and within their own communities. While it is impossible to understand every cultural perspective, following general principles of inclusivity, sensitivity, and adaptability can help prevent misunderstandings and ensure that spaces are welcoming to all. Designers can create inclusive and globally aware spaces by following these key principles:

1. Research for cultural awareness
  - Study the cultural, religious, and social norms of the intended users.
  - Engage with local experts, community members, or cultural consultants.
  - Consider historical and regional influences on architecture and design.
2. Inclusive design principles
  - Prioritize accessibility for people of all abilities (e.g., compliance with the Americans with Disabilities Act (ADA) and universal design).
  - Design for flexibility, allowing spaces to adapt to different users' needs.
  - Use neutral, inclusive design elements to accommodate diverse preferences.
3. Thoughtful spatial planning
  - Respect privacy needs, especially in cultures where gender-segregated spaces are important.
  - Ensure wayfinding is clear and intuitive, considering language and cultural differences.
  - Balance open and enclosed spaces to support varying interaction styles.
4. Material and symbolism sensitivity
  - Be mindful of color, imagery, and materials with different cultural meanings.
  - Use sustainable and locally sourced materials to respect environmental and cultural contexts.
  - Avoid designs that appropriate or misrepresent cultural symbols.
5. User engagement and feedback
  - Involve future occupants in the design process through surveys or focus groups.
  - Prototype or test spaces with diverse users to identify potential issues.
  - Remain adaptable and open to feedback even after a project is completed.

By integrating these strategies, designers can create spaces that are respectful, functional, and welcoming for a wide range of people, regardless of their background or experience.

## INTEGRATIVE DESIGN

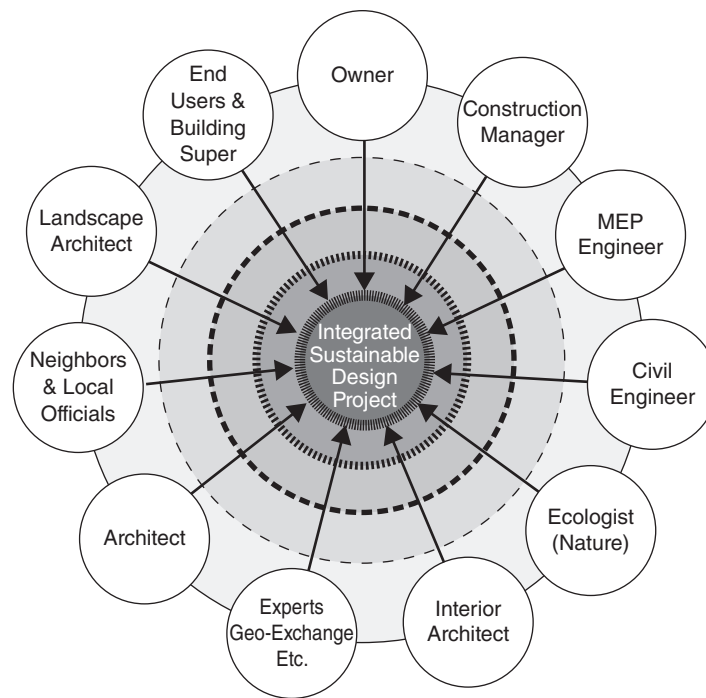
Another change in the evolving design process is considering and welcoming a much broader range of input at the very beginning of the design project. The process may have varying names depending on the prescribed process. It can be referred to as the integrative design process (IDP), integrative project design (IPD), co-creative design, transdisciplinary, interdisciplinary design, or integrated design (ID). The main focus is on including a broader base of views, professional input, and the perspectives of all stakeholders in creating the design directives at the very beginning of the project. It has been shown to create better projects that resonate deeper with occupants, function better and more efficiently, and have a smoother construction process.

Stakeholders are anyone who occupies or is impacted by the project. This would include not only the client who retains the design firm but also employees, maintenance people, patients, customers, or guests, along with other design professionals, engineers, or the community at large in public projects. Everyone works from the beginning to establish the initial design directives, with all participants' input being given consideration and value. Approaching a project this way increases ownership, alignment, and transparency, allowing the focus to be on the best possible solution for everyone. It also reduces changes and the cost of redesigning or changing projects during construction.

Integrated design can take varying forms and work at many different scales, and the number of stakeholders will vary with each project. A full examination of integrated design is beyond the scope of this book, but a brief overview is valuable here as it should be the basis for investigating the program and establishing the design directives affecting the space planning process. Holistic, integrated research is an essential beginning of the design process. The most prominent approaches or types are:

- **Charrette**—Short, focused design sessions in which a person from each stakeholder group is included to contribute their ideas, concerns, viewpoints, and desired outcomes for a project or portion of a project. The resulting designs are then collaboratively reviewed for positive aspects that should be pursued further and areas of concern that require further investigation, as well as the next steps for the project.
- **Co-creative**—A facilitated design exercise that includes the users of a space where everyone takes part by using physical representative elements of the project, such as desks, room modules, or massing elements, to explore and express their ideas, concerns, and preferences for a design project. The resulting ideas or information are incorporated or used as a foundation for the design team to move forward.
- **Integrated project delivery (IPD)**—Established by the AIA as a guide available to architects and the public that outlines their approach to integrated design and reviews the benefits. AIA considers IPD as a full project process that begins with schematic design and ends with project completion. The guide provides instructions on the principles of IPD, how to set it up, the legal documents and contracts that are involved, and the responsibilities of each party.
- **LEED (Leadership in Energy and Environmental Design) integrated design process**—Part of the rating system that encourages collaboration between principal mechanical system professionals to increase performance, environmental benefits, and human comfort. It is a three-phase process that spans the entire design and construction process. Documentation of the integrative process, administrative paperwork, and postoccupancy evaluation is required. Following LEED's IDP process earns the project points that count toward the project's LEED rating level.

Many rating systems have their own specified form of IDP. Consulting the process and procedures for the rating system you are pursuing should be the first step. The main goal of integrated design is to give everyone a voice, become aware of as many perspectives as possible, and shift focus to creating the best project possible (Illustration 1–1). This will create a broader information base to inform the design directives and a more meaningful, holistic solution serving all users.



Illus. 1-1 Charrette focus diagram.

## CASE OR PRECEDENT STUDIES

The evolving design process now also regularly includes using case or precedent studies to better understand the specific functional, geographical, and/or cultural aspects of a specific project type. Many larger architectural firms have specific divisions that specialize in researching current practices and seek to inform design at a larger scale, making their research available to everyone. This can be seen as collaborating with the industry in general and allows for a deeper view of past solutions and how they have performed over time. It is also a great way to gain information and insight on project types that are outside of the designer's experience.

Case studies do not always need to be an exhaustive or complicated analysis of a comparable project. Evaluating a project for a single feature or a limited set of sustainable or other strategies can also be effective and valuable. The following questions or areas are some of the typical things explored:

### General Information + Design Directives

- Project location, architect, engineers, and years in operation.
- Awards conferred or rating systems used?
- Population it was designed to serve?
- Are EBD or environmental psychology factors addressed?
- Aesthetic or experiential goals or directives?
- How does the project relate or interface with the surrounding area or site?
- What type of green spaces or daylighting and views does it provide?

Look to understand the thought process behind the physical and performative factors:

- Site placement, building configuration, and resulting synergies
- Sustainable strategies, features, or metrics

- Programmatic inter-relationships within the building (Are they mandatory or preferable?)
- Security features of the interior and exterior for physical and emotional safety
- Interaction with the surrounding community or culture
- Furniture, lighting, equipment types, sizes, and requirements

### Overarching Analysis Questions

- Are there any historic, geographic, or cultural factors that drove this project? If so, what, and how?
- What connection is there to nature, views, or daylight?
- From the images available, how does it feel to be there? What are the experiential qualities of the space?
- What can we learn about programming, adjacencies, or relationships?
- What are the deeper needs that motivated the design decisions?
- Advantages of this project? (What things would be great to replicate?)
- Areas of concern with this project? (What things should we look to avoid or address?)
- Has the project been successful over time?
- What other interesting or helpful aspects could make this project successful?

As you are analyzing, seek to understand the basis for the decisions, the goal is to create a deep and holistic understanding of the project type in general and the specific client, occupants, community, and other stakeholders. Another great resource for information is the open resources published by many of the larger architectural and interior design firms. They have entire departments that research specific project typologies and publish their research as articles or on their websites with the goal of advancing the profession.

## IN CONCLUSION

Design is more than aesthetics and functional efficiency; it incorporates many quantitative and qualitative factors. Projects must be inclusive and consider all the varying sets of users. The introduction, or review, of these topics mentioned above is important at the beginning of a book on space planning because it is the first foundational step in the design process. Once design decisions regarding the organization of spaces are established, they are rarely, if ever, reevaluated or changed to better meet the user's needs. It may seem overwhelming to consider all these topics at the beginning of the design process, but as you become more experienced, they will become part of your natural thought process and increase the effectiveness of your design solutions.

## ADDITIONAL RESOURCES

### Books

*A Pattern Language* by Christopher Alexander

*Brain Landscape* by John Paul Eberhard

*Environmental Psychology for Design* by Dak Kopec

*Place Advantage* by Sally Augustin

*The Memory of Place* by Dylan Trigg

*The Poetics of Space* by Gaston Bachelard

*Welcome to Your World: How the Built Environment Shapes Our Lives* by Sarah Williams Goldhagen

## Articles + Websites

Academy of Neuroscience for Architecture (ANFA) website: <http://anfarch.org>

AIA Equity, Diversity, and Inclusion website: <https://www.aia.org/design-excellence/equity-diversity-inclusion>

AIA Framework for Design Excellence website: <https://www.aia.org/design-excellence/aia-framework-design-excellence>

TED Talk: *What If the Poor Were Part of City Planning* by Smruti Jukur Johari

*Think Better- Neuroscience: The Competitive Advantage*. Retrieved from Steelcase website: <http://www.steelcase.com/eu-en/research/articles/topics/open-plan-workplace/think-better>

ADPro website: *Why Architectural Education Need to Embrace Evidence-Based Design, Now*, <http://www.architecturaldigest.com/story/architecture-education-needs-to-embrace-evidence-based-design-now#:~:text=Architects%20today%20face%20a%20unique,unconsciously%2C%20see%20and%20be%20in.>

## RELATED THEORIES

Those listed below are just a start, there may be more that are specific to the typology that you are designing, and all of these apply to all projects at some level. It is important that you fully and thoroughly understand all seen and unseen aspects and needs of all the stakeholders of your project. It is your responsibility as the designer to do this research, often providing the underlying information to your client, who is focused most often on the practical operational aspects of their facility.

**Environmental psychology**—This field explores the interplay between individuals and their surroundings. It examines how different aspects of the built environment, such as layout, lighting, color, and noise, influence human behavior, emotions, and wellbeing.

**Person-environment fit theory**—This theory suggests that individuals' wellbeing and behavior are influenced by the degree of compatibility between their characteristics and the characteristics of their environment. <https://pmc.ncbi.nlm.nih.gov/articles/PMC9965840/#:~:text=Person%2DEnvironment%20Fit%20Theory,manifest%20their%20personalities%20%5B29%5D>

**Prospect-refuge theory**—Developed by Jay Appleton, this theory suggests that humans are drawn to environments that offer a balance of prospect (openness and expansive views) and refuge (shelter and security). It proposes that environments that provide opportunities for both exploration and safety are perceived as more attractive and psychologically comforting. <https://cityterritoryarchitecture.springeropen.com/articles/10.1186/s40410-016-0033-1>

**Place attachment theory**—This theory explores the emotional bonds that individuals form with specific places. It suggests people develop strong attachments to places based on their experiences, memories, and social connections. The built environment plays a crucial role in shaping these attachments, influencing individuals' sense of identity, belonging, and wellbeing. [https://www.google.com/books/edition/Place\\_Attachment/TUttAAAAQBAJ?hl=en&gbpv=1&dq=place+attachment+theories&pg=PA23&printsec=frontcover](https://www.google.com/books/edition/Place_Attachment/TUttAAAAQBAJ?hl=en&gbpv=1&dq=place+attachment+theories&pg=PA23&printsec=frontcover)

**Behavior settings theory**—Developed by Roger Barker and colleagues, this theory examines how the physical and social attributes of specific settings influence human behavior. It suggests that certain environments have predictable patterns of behavior associated with them based on the activities and social interactions that occur within those settings. [https://www.ijhssnet.com/journals/Vol\\_2\\_No\\_19\\_Special\\_Issue\\_October\\_2012/2.pdf](https://www.ijhssnet.com/journals/Vol_2_No_19_Special_Issue_October_2012/2.pdf)

**Socio-environmental model**—This model emphasizes the dynamic interaction between social factors and the physical environment in shaping human behavior and experiences. It considers how factors such as social norms, cultural values, and economic disparities intersect with the built environment to influence patterns of behavior, social cohesion, and community wellbeing. <https://www.tandfonline.com/doi/pdf/10.1080/09613210801928131> <https://studyrocket.co.uk/revision/a-level-textiles-ccea/module-design-process-and-product-development/socio-cultural-and-environmental-influences-on-design>

